

Remarks/Arguments

In this Office Action, claims 1-5, 7-11, 15-19, 21-25, and 29-31 are pending and currently rejected. In this response, no claims have been amended, added, or canceled. The Applicants respectfully submit that the claims are patentable over the newly cited reference and respectfully request allowance of the Application.

Claim Rejections – 35 U.S.C. § 102

Claims 1-5, 7-11, 15-19, 21-25, and 29-31

These claims are rejected under 35 U.S.C. § 102(e) as being anticipated by Lu et al. (US 2007/0054632) (“Lu”). The Applicants respectfully traverse the rejections for at least the following reasons.

Claim 1 currently recites:

A method, comprising:

operating in a multiple input, multiple output (MIMO) mode by a transmitter device of a wireless network to communicate with a receiver device of the wireless network, the wireless network including at least one transmitter device and a plurality of receiver devices;

observing both physical (PHY) layer performance of the receiver device and media access control (MAC) layer performance of the transmitter device during said MIMO mode of operation; and

the transmitter device based at least on the observations switching from operating in the MIMO mode to operating in a spatial division, multiple access (SDMA) mode to communicate with the plurality of receiver devices including the receiver device, when poor MAC layer performance below a MAC layer performance threshold is observed for the transmitter device during the MIMO mode of operation of the transmitter device, even though good PHY layer performance above a PHY layer performance threshold is observed for the receiver device during the MIMO mode of operation of the transmitter device.

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987). “[A]bsence from the reference of any claimed element negates anticipation.” *Kloster Speedsteel AB v. Crucible, Inc.*, 793 F.2d 1565, 1571 (Fed. Cir. 1986) (emphasis added). Among other things, Lu fails to teach observing PHY layer performance of the receiver and MAC layer performance of the transmitter, and based on the observations, switching, at the transmitter, from MIMO mode to SDMA mode when the

MAC layer performance of the transmitter is below a MAC threshold even though the receiver has PHY layer performance above a PHY layer performance threshold.

Lu is directed toward the implementation of a wireless network in which wireless devices capable of various antenna configurations (SISO & MIMO) may communicate with “incompatible” legacy wireless devices capable of only SISO antenna configurations.¹ To implement such a wireless network, Lu describes “various modifications to the 802.11 frame structure to include PHY configuration (e.g. MIMO, legacy SISO, etc) information when scheduling communications between wireless stations and/or access points.”² Consequently, Lu expressly teaches configuring for either SISO or MIMO communication based on the antenna capabilities of the receiving device, not on MAC layer performance of the transmitter being below a MAC threshold as recited by the claims. Furthermore, Lu expressly teaches MIMO configuration as advantageous in comparison to SISO configuration.³ Consequently, one of ordinary skill in the art would understand Lu as teaching away switching from MIMO to SISO “even though the receiver has PHY layer performance above a PHY layer performance threshold.” For at least these reasons claim 1 is allowable over the cited art.

Additionally, in the Office Action, the Patent Office appears to equate the SISO configuration of Lu with the SDMA mode of the instant claim.⁴ The Applicants respectfully disagree with such a rejection. As is well known, SDMA involves the use of multiple antennas at the receiver and/or transmitter to create parallel spatial pipes for data transmission. In other words, SDMA is a MIMO system. Therefore the teachings of Lu which dictate switching from a MIMO mode to a SISO mode cannot be said to anticipate the instant claim which recites switching from a MIMO mode of operation to an SDMA mode of operation. Therefore, for at least this additional reason claim 1 is allowable over Lu.

Independent claim 15 includes generally similar recitations to that of claim 1 and is therefore allowable over Lu for at least the same reasons. Independent claims 7, 21, and 29, include generally similar features to those of claims 1 and 15 except that these claims include the

¹ Lu, p.3 [0030].

² Lu, p.3 [0033].

³ Lu, p.1 [0010].

⁴ Office Action, p.3 n.3.

recitation of switching from SDMA to MIMO. Therefore, for at least the same reason that claims 1 and 15 are allowable, claims 7, 21, and 29 are similarly allowable.

Claims 2-5, 8-11, 16-19, 22-25, and 30-31 depend from claims 1, 7, 15, 21, and 29 thereby incorporating their recitations. Therefore, for at least the same reasons that claims 1, 7, 15, 21, and 29 are allowable claims 2-5, 8-11, 16-19, 22-25, and 30-31 are similarly allowable.

While allowable due to their dependence on allowable independent claims, claims 2-5, 8-11, 16-19, 22-25, and 30-31 include recitations that are further patentable over the cited reference. For example, claims 2 and 16 include the recitation of observing a latency value of the MAC layer and switching is based at least in part on whether the observed latency value exceeds a threshold value. The Patent Office references paragraphs [0036]-[0037] to anticipate this recitation. The Applicant respectfully disagrees. At best, Lu teaches using modified MAC headers to control a PHY configuration of a wireless device in order to enable legacy SISO-only stations to mix with stations capable of either SISO or MIMO configurations on a wireless network.⁵ There is simply no teaching of monitoring a latency value of the MAC layer and switching to a SDMA mode based at least in part on the observed latency value exceeding a threshold. Claims 8 and 22 include generally similar recitations to that of claims 2 and 16 and are therefore allowable for at least similar reasons.

As another example, claims 3 and 17 include the recitation of observing a throughput value of the MAC layer and switching based at least in part on whether the throughput value is below a threshold. Neither the cited passages nor any other passage within Lu teach such a recitation. As stated previously, Lu is directed toward enabling compatibility between various devices based on their antenna capabilities, not on a throughput value of a MAC layer being below a threshold. Claims 9 and 23 include generally similar recitations and are therefore allowable for at least the same reasons.

As another example, claims 4 and 18 include recitations of observing a BER of the PHY layer and switching to an SDMA mode even though the BER is below a value indicating good PHY layer performance. There is simply no teaching of observing a BER in Lu. At best, Lu teaches “a polling frame specifies a PHY configuration that should be implemented in a polled station for future frame communication. The polled station thus is requested to respond with an

ACK or data, if present, using the specified PHY configuration.”⁶ One of ordinary skill in the art would not construe a modified polling frame dictating an antenna configuration as anticipating switching to an SDMA mode even though an observed BER of the PHY layer indicates good performance. For at least this reason claims 4 and 18 are further allowable. Claims 8 and 22 include generally similar recitations and are therefore similarly allowable.

As another example, claims 5 and 19 include the recitations of observing a data rate, a signal-to-noise ratio, or a spectral efficiency of the PHY layer, and switching even though a data rate, a signal-to-noise ratio, or a spectral efficiency of the PHY layer indicates good PHY layer performance. As stated previously, Lu fails to teach, expressly or inherently, such a recitation and rather focuses on whether various configurations are possible and choosing the most efficient one for communication in a mixed wireless network. For at least this reason claims 5 and 19 are further allowable. The applicants note that claims 9, 23, and 31 include generally similar recitations and are allowable for at least the same reasons.

CONCLUSION

In view of the foregoing, Applicant respectfully submits that all pending claims are in condition for allowance. Early issuance of the Notice of Allowance is respectfully requested.

Please charge any shortages and credit any overages to Deposit Account No. 500393.

Respectfully submitted,

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Dated: July 14, 2008

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⁵ Lu, p.2 [0017]

⁶ Lu, p.5 [0044]